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ITCS332: Concepts of Programming Languages

QUIZ#7: Chapter 6_Types

5) Who is responsible for each of the following?

- a) Generating range-checking code for every assignment to a subrange variable.

Language implementers ✓

- b) * is used to define pointers in C++.

programmer language designer ✓

- c) Strings are implemented using adjacent memory cells or linked list.

compiler designer ✓

- d) Pointers are included in C# and excluded from JAVA. Language designer ✓

- e) In FORTRAN array index is enclosed in parentheses ().

Language programmers ✓

- 6) Given a FORTRAN array definition: **DIMENSION T(180)** and its base address is 2250, element size is 5 bytes, the address of the array element **T(100)** is

$$T(100) = 2250 + 5 * (100 - 1)$$

Given a matrix **U: array[80 .. 150, 20 .. 60]** of **double**; array's starting address is 750; element size is 8 bytes. Show ALL your calculations.

- 7) Assuming row major ordering, calculate the address of matrix element **U[100, 40]**.

$$U[100, 40] = 750 + 8 * ((100 - 80) * 41 + (40 - 20))$$

- 8) Assuming column major ordering, calculate the address of matrix element **U[100, 40]**.

$$U[100, 40] = 750 + 8 * ((40 - 20) * 71 + (100 - 80))$$

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QUIZZ#7: Chapter 7_ASSIGNMENT STATEMENT & EXPRESSIONS

Let the function **fun** be defined as

```
int fun (int *k)
{
    *k += 4;
    return 3 * (*k) - 1;
}
```

```
void main()
```

```
{
    int i = 10, j = 10, sum1, sum2;
    sum1 = ( i / 2 ) + fun ( &i);
    sum2 = fun (&j ) + ( j / 2);
}
```

$$R \rightarrow L: i = 14;$$

$$3 + 41 =$$

$$L \rightarrow R: i =$$

What are the values of sum1 and sum2

- If the operands in the expressions are evaluated **left to right**?

$$i/2 = 5, \text{fun}(2i) = (3 \times 14) - 1 = 41$$

$$\text{sum1} = 5 + 41 = 46$$

sum2

$$\text{fun}(2j) = 41, j = 14$$

$$\text{sum2} = 41 + (14/2) = 41 + 7 = 48$$

- If the operands in the expressions are evaluated **right to left**?

$$\text{sum2} = \text{fun}(2i)$$

$$\text{sum1} = 41 + (14/2) = 41 + 7 = 48$$

$$\text{sum2} = 5 + 41 = 46$$

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QUIZZ#7: Chapter 7_Expressions & Assignments

Consider the following code: `"int a, b; float c; c = a / b; "` and answer the next 2 questions (1 and 2).

- 1) If the assignment coercion is done before operand coercion, the value of c will be: int
- 2) If the operand coercion is done before assignment coercion, the value of c will be: int
- 3) The use of an operator for more than one purpose is called operator overloading
- 4) 2 disadvantages of operator overloading are: loss of readability and error
- 5) Give a C++ expression that includes a binary operator: a = b - and another expression that includes a ternary operator: (a < b) ? a : b
- 6) The order of operator evaluation in expressions depends on the Precedence and associativity rules.
- 7) The binary operator that appears between operands is called infix operator.
The binary operator that precedes operands is called Prefix operator.
- 8) In C++, the type conversion which requires explicit code in programs is called Casting
- 9) A short circuit evaluation is one in which the result of an expression is determined without evaluating all of the operands and/or operators.
- 10) Functional side effects occur when a function changes a 2-way parameter or non-local variables.

Expressions
Chapter 7. Expressions

8) e.g. $\pi \in (\text{int})$ angle
Arch. Float (sum)

5) ternary operators ::

$$\text{average} = ((\text{count} == 0) ? 0 : \text{sum} / \text{count})$$

Literature Review